

INTRODUCTION TO PROCESS CONTROL

COURSE SYLLABUS

Revised: 11/29/2011

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COURSE NUMBER: EEM 162

PREREQUISITE(S): None

CO-REQUISITE(S):

COURSE DESCRIPTIONS This course is an introduction to control systems theory and process control characteristics.

TEXTBOOK(S): NJATC. *Fundamentals of Instrumentation*, Clifton Park: Thomson Delmar Learning, 2005.

REFERENCE(S): Various Research Books available by way of the E-Books available on-line through the STC Library.

OTHER REQUIRED MATERIALS, TOOLS, AND EQUIPMENT: Safety glasses are required during all laboratory exercises. It is recommended that the student provide his/her own multi-meter. Safety glasses and calculators are not provided by the College.

METHOD OF INSTRUCTION: This course is a hybrid lecture/lab type course with materials available on WebCT; (STC's distance learning on-line resource). An assortment of quizzes, worksheets and information resources are available through this medium. Participation will be measured through the awarding of points for various assignments (totaling 1000) for the semester. The final grade will be awarded in a manner whose ratio is as in the grading system below.

GRADING SYSTEM:

90	-	100	=	A
80	-	89	=	B
70	-	79	=	C
60	-	69	=	D
Below	-	60	=	F

GRADE CALCULATION METHOD:

Tests and Work Sheets	=	40%
Labs/Papers	=	40%
Participation	=	<u>20%</u>
		100%

**ATTENDANCE
POLICY:**

Students are responsible for punctual and regular attendance in all classes, laboratories, field trips, and other class activities. The College does not grant excused absences; therefore, students are urged to reserve their absences for emergencies. When illness or other emergencies occur, the student is responsible for notifying instructors and completing work missed.

Students are tardy if not in class at the time the class is scheduled to begin. Tardy students are admitted to class at the discretion of the instructor.

If you have attended at least one session during the first week of the semester you are responsible for dropping yourself from the class. It is the students' responsibility to withdraw from a course. A student who stops attending class and fails to initiate a withdrawal will remain on the class roster.

If you do not attend a class session during the first week of class you will automatically be dropped by the College. A student who does not complete an assignment, test, or final exam in the course will receive a zero for each missing grade and the final course grade will be calculated accordingly.

Absences for Religious Holidays: Students who are absent from class in order to observe religious holidays are responsible for the content of any activities missed and for the completion of assignments occurring during the period of absence. Students who anticipate their observance of religious holidays will cause them to be absent from class and do not wish such absences to penalize their status in class should adhere to the following guidelines:

1. Observance of religious holidays resulting in three or fewer consecutive absences: Discuss the situation with the instructor and provide written notice at least one week prior to the absence(s). Develop (in writing) and instructor-approved plan which outlines the make up of activities and assignments.
2. Observances of religious holidays resulting in four or more consecutive absences: Discuss the situation with the instructor and provide the instructor with written notice within the first 10 days of the academic term. Develop an instructor-approved plan which outlines the make-up of activities and assignments.

**ACADEMIC
CONDUCT:**

ACADEMIC DISHONESTY: Students are expected to uphold the integrity of the College's standard of conduct, specifically in regards to academic honesty. All forms of academic dishonesty including, but not limited to, cheating on assignments/tests, plagiarism, collusion, and falsification of information will call for disciplinary action. Disciplinary action imposed may include one or more of the following: written reprimand, loss of credit for assignment/test, termination from course, and probation, suspension, or expulsion from the College. For further explanation of this and other conduct codes, please refer to the Student Handbook.

CELLULAR PHONES AND PAGERS/BEEPERS: Cellular phones, pagers and beepers are not permitted to be turned on or used within the classroom. Use of these devices during classroom time will be considered a violation of the student code as it relates to "disruptive behavior."

**CLASS/LAB
PROCEDURES:**

Class will start on time. The class and lab areas must be kept clean at all times. When you leave your lab station, notify the instructor. Failure to wear safety glasses (no sun glasses) will result in dismissal from the lab.

ACCOMMODATIONS:

Students who need special accommodations in this class because of a documented disability should notify Student Disability Services. You may contact Student Disability Services by calling, (864) 592-4811, toll-free 1-800-922-3679; via email through the Spartanburg Community College web site at www.sccsc.edu/SDS/; or by visiting the office located in the Dan Lee Terhune Student Services Building, room 112 of the Spartanburg Community College campus. By contacting Student Disability Services early in the semester, students with disabilities give the College an opportunity to provide necessary support services and appropriate accommodations.

**COURSE
COMPETENCIES &
OBJECTIVES:**

Upon satisfactory completion of this course, the student will be able to:

- I. Identify the components and explain the operation of the major internal parts of a process controller.
 1. Explain the purpose and list the features of various types of internal controller components.
 2. Describe the difference between the following types of controllers: Low-technology, Medium-technology and High-technology.
 3. List and explain the operation of five different types of controller boards.
 4. List the sequence of events in the signal path control of an automated system.

- II. Develop and demonstrate the execution of a system program.
 1. State the purpose for the two basic programs used in controllers.
 2. Demonstrate the process of developing a program.
 3. Define the importance of flowcharting a program.
 4. Construct a flowchart and program concept into machine codes.

- III. Identify various sensors used in instrumentation and explain their relationship to transducers.
 1. Demonstrate an understanding of analog and digital signals.
 2. Demonstrate the actions occurring in a comparator.
 3. Demonstrate knowledge of control algorithms.
 4. Explain how a closed loop control system functions the control a process variable.

- IV. Analyze a process control system operation and select the appropriate sensing equipment for that operation.
 1. Describe the purpose of various types of sensors.
 2. Propose and implement the use of sensors intelligent input to a system program.
 3. Observe the operation of various sensors on a CIM system.